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September 10, 1986
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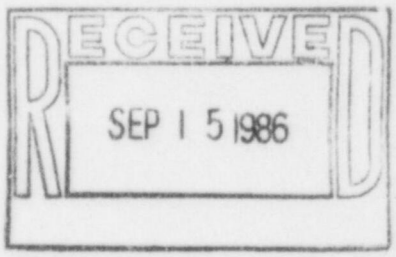

Mr. Robert D. Martin
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South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
Final Report Concerning
Failure of Limitorque Motor Operated Valve Actuators

Dear Mr. Martin:

On August 11, 1986 Houston Lighting & Power Company notified your office pursuant to 10CFR50.55(e), of an item concerning failure of Limitorque motor operated valve actuators. Enclosed is our Final Report on this item. We have found the item to be "reportable" pursuant to 10CFR50.55(e) and 10CFR21.

If you should have any questions on this matter, please contact Mr. C. A. Ayala at (512) 972-8628.

Very truly yours,

J. T. Westermeier for
J. H. Goldberg
Group Vice President, Nuclear

RLP/yd

Attachment: Final Report Concerning Failure of
Limitorque Motor Operated Valve Actuators

L1/NRC/eb-mg-1

86-1051

IE-27

cc:

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Revised 5/22/86

South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
Final Report Concerning
Failure of Limitorque Motor Operated Valve Actuators

I. Summary

On August 11, 1986 Houston Lighting & Power Company (HL&P) notified your office, pursuant to 10CFR50.55(e), of an item concerning failure of Limitorque motor operated valve actuators. During Startup prerequisite testing, three (3) safety-related motor operated valves failed to operate as designed. The motor in each case was observed to run, but the valve failed to operate. After an analysis to determine the root cause of the problem, it was found to be limited to type SMB-00 and SMB-000 operators. As a result of the above, a rework program for all safety-related type SMB-00 and SMB-000 operators was initiated. HL&P has determined that this item is reportable pursuant to 10CFR50.55(e) and 10CFR21.

II. Description

During Startup prerequisite testing, three safety-related motor operated valves (MOVs) failed to operate as designed. The motor in each case was observed to run, but the valve failed to operate.

In each case upon removal of the motors to inspect the Limitorque operator, one tripper finger was found broken. The second tripper finger and the two tripper cams (Figure 1) were found gouged as well. A small amount of scarring was also noted on the operator housing near the normal location of the broken tripper finger.

The concern is limited to Limitorque SMB-00 and SMB-000 operators which use tripper finger assemblies in the declutch mechanism. This also includes type SB-00, SB-000, SBD-00 and SBD-000 operators which are modified versions of the SMB type operators.

During normal transfer from manual to motorized operation of an MOV, the tripper cams knock the tripper fingers off of the tripper adjustment arm. The longer tripper finger is struck by its cam, causing it to drop behind the tripper adjustment arm. The shorter tripper finger moves against the tripper adjustment arm. The shorter finger is then struck by its cam after a 180° rotation of the motor shaft. This striking of the shorter finger will knock it off of the tripper adjustment arm thus causing the operator to go to the motorized position.

During the events in question it is postulated that the tripper fingers did not drop behind the tripper adjustment arm because the tripper fingers had been ground to approximately the same length. All three MOV actuator failures were observed to have ground tripper fingers. Due to

the operator housing design and because the tripper fingers did not drop behind the tripper adjustment arm, the valve-side tripper finger was struck by its cam and in turn struck the housing of the operator as the speed of the motor increased. This condition existed until the valve-side tripper finger broke due to repeated impact with the cam and the operator housing. During this time the motor-side tripper finger and its cam had worn to the extent that the cam would not knock the tripper finger off the tripper adjustment arm keeping the operator in the manual position.

STP ground the tripper fingers during a rework program of Limitorque valve operators prompted by the NRC CAT review (November 1985). An onsite Limitorque service representative initiated and agreed with a change to a site procedure (CIP 2.2-62) which instructed the rework teams to grind the tripper fingers to approximately the same length. After rework had already begun, subsequent communication with Limitorque (letters of March 18 and June 3, 1986) later reversed this direction and required that the fingers be of uneven length. Another Limitorque service representative confirmed this requirement and provided justifications for not having fingers of even length, i.e. the possibility of the motor not engaging the automatic position when called upon to do so.

The root cause of this deficiency is the erroneous information and direction provided to the project by the first Limitorque service representative. This caused the grinding of the fingers which led to the failure of the operators.

III. Corrective Actions

The tripper finger assembly in each of the three damaged MOV actuators was removed and replaced with a new tripper finger assembly. Tripper cams will be replaced as required.

A rework program of all safety-related type SMB-00 and SMB-000 operators was initiated. This rework program being performed under the site Nonconformance Report procedures will require the inspection and replacement as needed, of installed tripper fingers with new fingers of uneven lengths. Approximately 125 safety-related Unit 1 MOVs will be reworked during this program. The valve rework program will be completed by Unit 1 fuel load. No tripper fingers on Unit 2 MOVs were ground.

IV. Recurrence Control

Training was provided by Limitorque for Engineering, Construction and Startup personnel on the function and operability of the tripper fingers. This training emphasized that the tripper fingers should be of different lengths and should not be ground.

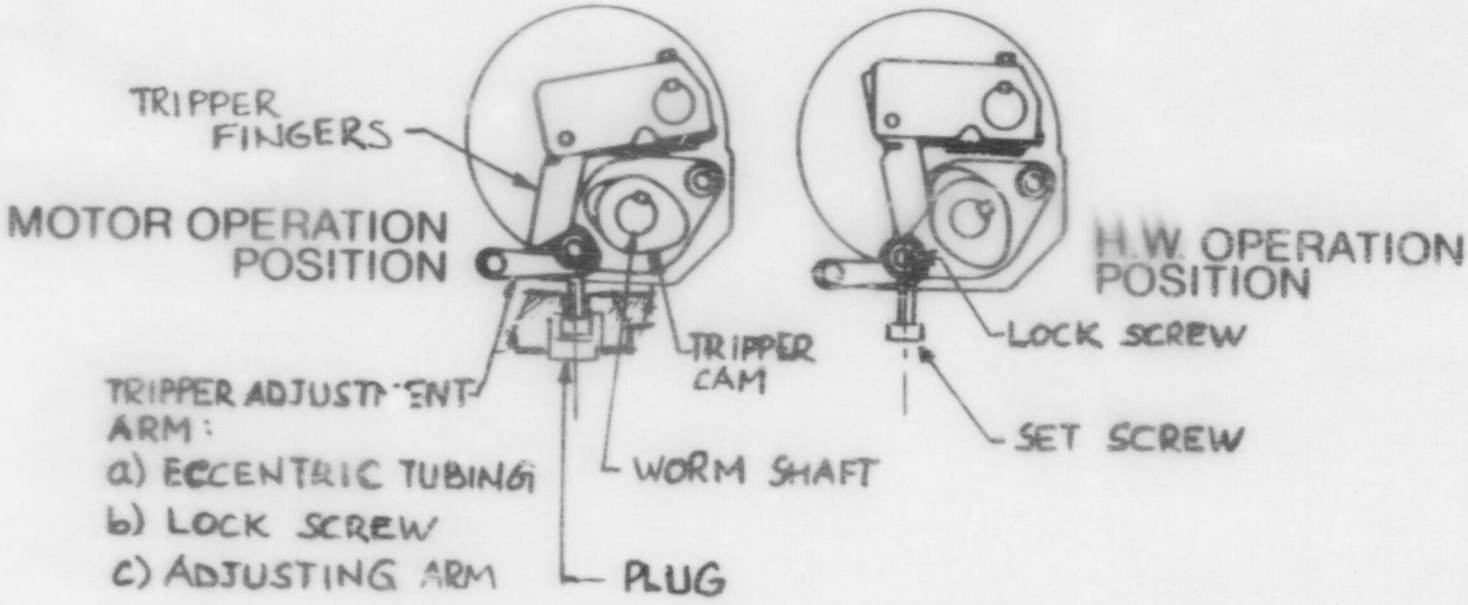
Procedure CIP 2.2-62 was revised to delete the instruction to grind the tripper fingers. The adjustments necessary for correct assembly and operation of the tripper finger assembly will be incorporated in a new revision of this CIP to be issued within approximately two weeks.

Procedure SSP-47 (which covers the rework of Unit 2 MOVs) was issued without reference to grinding the tripper fingers and includes adjustment steps as required

Procedure SSP-59 was issued in March 1986 for the control of vendors onsite. The erroneous direction from the vendor representative was provided prior to the issuance of SSP-59. This procedure has been reviewed to determine the need for tighter controls when vendor technical representatives recommend changes to safety-related equipment and we have determined that it is acceptable in its current form.

V. Safety Analysis

If left uncorrected, the possibility exists that a motor operated valve would fail to perform its intended function due to grinding of the tripper fingers, and the ability of the plant to mitigate the consequences of a Design Basis Accident could have been affected. Manual operation of the valves would still have been possible, but automatic motorized operation was compromised by the grinding of the tripper fingers. Therefore, this deficiency is reportable pursuant to 10CFR50.55(e) and 10CFR21.



SMB.SB.SBD OPERATORS SIZE 00.-000

TERMINOLOGY AND ADDED FEATURES
(MOTOR SIDE VIEW)

FIGURE 1